

WHAT IS CLAIMED IS:

1. A method of cleaning a surface of an object by removing contaminant particles from the surface of the object, the method comprising:
  - placing the object in the chamber with the surface to be cleaned exposed;
  - sealing the chamber; and
  - reducing a gas pressure in the chamber, wherein the gas pressure is reduced to  $10^{-2}$  mbar in less than 5 seconds.
2. A method according to claim 1, wherein the object is a lithographic mask.
3. A method according to claim 1, further comprising increasing the gas pressure subsequent to reducing the gas pressure, wherein the gas pressure is increased in less than 5 seconds.
4. A method according to claim 3, wherein the gas pressure is increased to an original gas pressure before the gas pressure was reduced.
5. A method according to claim 1, further comprising cycling the gas pressure between a low pressure and a higher pressure.
6. A method according to claim 1, further comprising increasing the gas pressure prior to reducing the gas pressure.
7. A method according to claim 1, further comprising providing an electric field to attract and remove the contaminant particles from the surface.
8. A method according to claim 7, further comprising charging the surface of the object.
9. A method according to claim 1, further comprising vibrating the object.
10. A method according to claim 1, further comprising changing the temperature of the object.

11. A method according to claim 1, further comprising bombarding the surface of the object with inert particles.
12. A method according to claim 11, wherein the inert particles are condensed  $\text{CO}_2$ .
13. A method according to claim 1, further comprising applying a layer of liquid to the surface of the object.
14. A method according to claim 13, wherein the layer is uniform across an entire surface of the object.
15. An apparatus for removing contaminant particles from surfaces of objects, the apparatus, comprising:
  - a chamber with a door;
  - a pump configured to reduce the gas pressure of the sealed chamber; and
  - at least one of the following:
    - a voltage source configured to provide an electric field to attract and remove the contaminant particles from the surface;
    - an actuator configured to vibrate the object;
    - an inert particle supply configured to bombard the surface of the object with inert particles; and
    - a liquid supply configured to apply a layer of liquid to the surface of the object.
16. An apparatus according to claim 15, wherein the voltage source is configured to charge the surface of the object.
17. An apparatus for removing particles from surfaces of objects, comprising:
  - a chamber with a door;
  - means for reducing the gas pressure of the sealed chamber; and
  - at least one of the following:
    - means for providing an electric field to attract and remove the contaminant particles from the surface;
    - means for vibrating the object;

means for bombarding the surface of the object with inert particles; and  
means for applying a layer of liquid to the surface of the object.

18. An apparatus according to claim 17, wherein the means for providing an electric field charges the surface of the object.

19. A lithographic projection apparatus, comprising:  
a radiation system configured to provide a projection beam of radiation;  
a support configured to support a patterning device, the patterning device configured to pattern the projection beam according to a desired pattern;  
a substrate table configured to hold a substrate;  
a projection system configured to project the patterned beam onto a target portion of the substrate; and  
a device configured to remove contaminant particles from surfaces of objects comprising:  
a chamber capable of being sealed; and  
a pump configured to reduce a gas pressure of the sealed chamber to  $10^{-2}$  mbar in less than 5 seconds.

20. A lithographic apparatus according to claim 18, wherein the device configured to remove contaminant particles comprises at least one of the following:  
a voltage source configured to provide an electric field to attract and remove the contaminant particles from the surface;  
an actuator configured to vibrate the object;  
an inert particle supply configured to bombard the surface of the object with inert particles; and  
a liquid supply configured to apply a layer of liquid to the surface of the object.